PhD Student Vacancy for the Lowcomote Project

Live Model transformation for Distributed Low-Code Platforms

IncQuery Labs is hiring a PhD Student for its Lowcomote Project in Budapest.

The Lowcomote project

The MSCA ITN 2018 project Lowcomote will train a generation of experts that will upgrade the current trend of Low-code development platforms (LCPDs) to a new paradigm, Lowcode Engineering Platforms (LCEPs). LCEPs will be open, allowing to integrate heterogeneous engineering tools, interoperable, allowing for cross-platform engineering, scalable, supporting very large engineering models and social networks of developers, smart, simplifying the development for citizen developers by machine learning and recommendation techniques. This will be achieved by injecting in LCDPs the theoretical and technical framework defined by recent research in Model Driven Engineering (MDE), augmented with Cloud Computing and Machine Learning techniques.

The Lowcomote project will train the first European generation of skilled professionals in LCEPs. The 15 future Early Stage Researchers (ESRs) will benefit from an original training and research program merging competencies and knowledge from 5 highly recognised academic institutions and 8 large and small industries of several domains. Co-supervision from both sectors is a promising process to facilitate agility of our future professionals between the academic and industrial world.

Partners

IMT Atlantique (FR), University of York (UK), Universidad Autónoma de Madrid (ES), University of L'Aquila (IT), JK University of Linz (AT), British Telecom (UK), Intecs (IT), Uground (ES), CLMS (UK), IncQuery Labs (HU), SparxSystems (AT), Metadev (ES), The Open Group (UK)

Training activities

The training program of Lowcomote aims at enabling the recruited ESRs to develop a broad range of scientific, technical and transferable skills that will prepare them for fruitful careers in academia and industry, namely thanks to training led by world experts in the field and timely and high-quality feedback by all co-supervisors.

In particular, the network will provide training for the three main competences needed for developing future LCEPs:

- MDE, for domain analysis, language construction and code generation;
- Cloud computing, for an efficient use of the Cloud infrastructure to manage a large number of users and artefacts;
- Machine learning, for building smart assistants for citizen developers.

Other training activities will include communication, career development and plan, and entrepreneurship.

Phd. research topic: Live Model Transformation for Distributed Low-Code Platforms [WP5]

Within the context of the Lowcomote project, the PhD candidate will work to the following specific research subject. The PhD will be given by the Johannes Kepler University of Linz.

Objectives:

With the growing adaptation of LCEPs in high complexity system development and operation scenarios (e.g., IoT, safety-critical systems, etc.) the increasing complexity and the sheer size of modelling artefacts poses new challenges for the underlying model processing and transformation techniques. Especially, in the unique models@runtime context, where system models are continuously updated to react to the changes happening in their environment.

The main objective of this project is to achieve the execution of model transformations on very large and distributed models over a parallel and distributed platform. While it is already a major challenge in case of batch transformation execution, the challenge is multiplied in the case of live model transformations, which are continuously executed in the background and react to changes and events in the environment. This requires developing an efficient search-based query evaluation algorithm capable of operating on models of millions of elements and can also be efficiently executed on distributed and parallel environments.

A secondary objective is to provide a framework to construct domain-specific model transformation languages that natively support parallel and distributed execution. More precisely, the goal is to provide the appropriate components, defined at the right level of abstraction, for a LCE engineer to define or adapt their own model processing/transformation language, using these modular components.

Expected results:

The overall goal is to allow modelers to build low-code model transformation languages and systems that can be executed in a parallel and distributed environment, and efficiently process very large models within the range of 100+ million model elements, with as little effort as possible. The goal is to transform models in the size range of at least one order of magnitude larger than single computer solutions are currently capable of, which is around 10 million model elements.

The main outcome of the project is an open source model transformation engine that is able to execute transformations over a highly distributed computing infrastructure, providing scalability both in terms of model size and transformation complexity, and reacting immediately changes in the environment. The engine is uniformly accessible for the different domain-specific transformation languages. As another outcome of the project, such an engine should provide additional support for traceability and debugging for executing parallel and distributed model transformations.

Enrolment in Doctoral degree: JKU Linz

Requirements

Degree: Master degree in Computer Science or equivalent providing access to PhD programs.

Language: English proficiency must be attested either through a previous English language diploma, or an internationally recognized proficiency test (at least C1 level of the Common European Framework of Reference for Languages i.e. IELTS, IBT, TOEFL or Cambridge).

Career: When starting their contract (September 2019), selected researchers should be within the first four years of their careers. This means being both within a four years window following their most recent graduation and not having been awarded a prior doctoral degree so far.

Mobility: At the time of recruitment, the researcher must not have resided, or carried out his/her activity in Hungary for more than 12 months in the 3 years prior to recruitment date.

Employment conditions

Full-time Equivalent Position

Duration: 36 months, including 2 secondments of 3 months each at other consortium members' premises (see Hosting institution section)

Starting date: 1st September 2019

Remuneration:
- Gross 2230 euros monthly salary
- Monthly family allowance
- Monthly mobility allowance

Research, Training and Networking costs:
All relevant expenses linked to the research and training activities (travel, accommodation, etc.) will be paid by the project budget.

Hosting institution

The ESR will spend 2 secondments of 3 months at the premises of 2 project's members as detailed in the following table.

	Planned Secondments	Hosting Partner	Start – End Date
1	Collaboration with ESR14 to harmonize primitive transformation operations definition and execution mechanisms.	Institut Mines Telecom (France)	M23-M25 (November 2020 - January 2021)
2	Collaboration with ESR11 on implicit data distribution by model partitioning.	Sparx (Austria)	M18-M20 (June – August 2020)

Supervisors

Manuel Wimmer – JKU Linz,
István Ráth – IncQuery Labs,
Ákos Horváth – IncQuery Labs,

Application process

All applications shall be sent before 15th May 2019 by filling in the form on the Lowcomote website.

Applications are composed of the following documents in English (and when necessary a certified translation of official documents):

1. a complete CV with references to past research and training experiences;
2. a motivation letter highlighting the consistency between the candidate 's profile and the chosen ESR position for which they are applying;
3. at least 2 reference contacts (could be substituted by a reference letter, which should be in English or in certified translation)
4. scan of the degree qualification.
5. scanned copy of valid identification document (identity card or passport)
6. proof of proficiency in English (either through a previous English language diploma, or an internationally recognized proficiency test - at least C1 level of the Common European Framework of Reference for Languages i.e. IELTS, IBT, TOEFL or Cambridge).

More Information at: https://www.lowcomote.eu

IncQuery Labs joined the Lowcomote Project and now we are looking for an ideal candidate for doing their PhD researches with us! Read more of the job on our website!